

CLAIMS

1. A method of correction of the error in an output digital signal of an analog/digital converter (ADC), in which the error is introduced by a multibit digital/analog converter (DAC) incorporated in the ADC, comprising:

5 providing a scrambling scheme of input signals to the DAC, the scrambling scheme defining a scrambling of the input signals as a function of values of a group of variables, to produce scrambled input signals;

extrapolating from the scrambling scheme parameters defining a transformation operated by the scrambling scheme on the input signals to
10 obtain the scrambled input signals;

assigning to the variables values substantially uncorrelated to each other;

on the basis of the parameters, of the substantially uncorrelated values and of the scrambled signals, calculating coefficients of a linear combination
15 of vectors of a vector space, the linear combination of vectors corresponding to a vector of the vector space representative of the error introduced by the multibit DAC;

calculating the correlation of a signal containing the error introduced by the multibit DAC with each coefficient of the linear combination of vectors, to
20 extract an estimation of each of the vectors;

on the basis of the coefficients and of the estimations of the vectors, calculating a linear combination representative of the estimation of the error introduced by the multibit DAC; and

using the estimation of the error introduced by the multibit DAC to
25 correct the output signal of the ADC.

2. The method according to claim 1, in which the calculating the correlation includes:

a) calculating approximate estimations of each vector by calculating the correlation on a prescribed number of sampling periods,

5 b) correcting the signal containing the error through the approximate estimations, and

iterating the actions a) and b).

3. The method according to claim 2, in which the calculating approximate
10 estimations includes, for each vector, calculating averages, on the prescribed number of sampling periods, of products of the coefficients by the signal containing the error.

4. The method according to claim 3, in which the calculating averages
15 includes:

accumulating in an accumulator the products;

obtaining from the accumulator pairs of values accumulated at a distance of the prescribed number of sampling periods;

obtaining a difference value of each pair of values; and

20 dividing the difference value for an accumulated value of the respective coefficient.

5. The method according to claim 4, in which the calculating approximate estimations includes applying to each average on the prescribed number of sampling periods a pre-determined weight factor, to get a weighted average, and accumulating the weighted averages in an accumulator.

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6. The method according to claim 1, in which the providing the scrambling scheme includes:

a) providing a permutation law of the input signals to the DAC, in which the law has a first type of permutation and a second type of permutation mutually alternative, the first type of permutation being triggered by a first value assigned to a respective first variable, and the second type of permutation being triggered by a second value assigned to the respective first variable;

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b) grouping the permuted signals in two separated sets of signals;

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c) permuting the signals of each set on the basis of the law, depending on values assigned to respective second and third variable; and

d) repeating the actions b) and c), permuting the signals on the basis of the law, each time as a function of values assigned to further variables, until the two separated sets contains only one signal each.

7. A device for correction of error in an output digital signal of an analog/digital converter (ADC), in which the error is introduced by a multibit digital/analog converter (DAC) incorporated in the ADC, comprising:

5 scrambling means to produce, starting from input signals to the multibit DAC, scrambled input signals as a function of values assigned to a group of variable, the scrambling means having associated therewith parameters defining a transformation operated by the scrambling means;

means for assigning to the variables substantially uncorrelated values;

10 calculation means for calculating, on the basis of the parameters, of the substantially uncorrelated values and of the scrambled signals, coefficients of a linear combination of vectors of a vector space, the linear combination of vectors corresponding to a vector of the vector space representative of the error introduced by the DAC;

15 correlation means for calculating the correlation of a signal containing the error introduced by the multibit DAC with each coefficient of the linear combination of vectors, to extract estimations of each of the vectors; and

means for calculating a linear combination representative of the estimation of the error introduced by the multibit DAC and to correct the ADC output signal on the basis of the estimation of the error.

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8. A computing system comprising:

at least one analog/digital converter (ADC), each including a multibit digital/analog converter (DAC) ; and

5 at least one device, each being electrically coupled with a respective one of the at least one ADC, for correction of error in an output digital signal of the respective one of the at least one ADC, in which the error is introduced by the multibit DAC included in the respective one of the at least one ADC, each of the at least one device comprising:

10 scrambling means to produce, starting from input signals to the multibit DAC included in the respective one of the at least one ADC, scrambled input signals as a function of values assigned to a group of variable, the scrambling means having associated therewith parameters defining a transformation operated by the scrambling means;

means for assigning to the variables substantially uncorrelated values;

15 calculation means for calculating, on the basis of the parameters, of the substantially uncorrelated values and of the scrambled signals, coefficients of a linear combination of vectors of a vector space, the linear combination of vectors corresponding to a vector of the vector space representative of the error introduced by the multibit DAC included in the respective one of the at
20 least one ADC;

correlation means for calculating the correlation of a signal containing the error introduced by the multibit DAC included in the respective one of the at least one ADC with each coefficient of the linear combination of vectors, to extract estimations of each of the vectors; and

means for calculating a linear combination representative of the estimation of the error introduced by the multibit DAC and to correct the error in the output digital signal of the respective one of the at least one ADC on the basis of the estimation of the error.